in decreased blood volume and intestinal dilation. Peristalsis is stimulated, and intestinal motility is increased.

Early symptoms of dumping syndrome occur within 5 to 30 minutes after eating. These symptoms result from intestinal dilation, peristaltic stimulation, and hypovolemia caused by undigested food in the proximal small intestine. Manifestations include nausea with possible vomiting, epigastric pain with cramping and borborygmni (loud, hyperactive bowel sounds), and diarrhea. Systemic symptoms from the hypovolemia and reflex sympathetic stimulation include tachycardia, orthostatic hypotension, dizziness, flushing, and diaphoresis.

The entry of hyperosmolar chyme into the jejunum also causes a rapid rise in the blood glucose. This stimulates the release of an excessive amount of insulin, leading to hypoglycemic symptoms 2 to 3 hours after the meal. The pathogenesis and clinical manifestations of dumping syndrome are represented in Figure 23–12. Dumping syndrome is typically self-limiting, lasting 6 to 12 months after surgery; however, a small percentage of people continue to experience long-term symptoms.

Dumping syndrome is managed primarily by a dietary pattern that delays gastric emptying and allows smaller boluses of undigested food to enter the intestine. Meals should be small and more frequent. Liquids and solids are taken at separate times instead of together during a meal. The amount of

**Figure 23–12** The pathogenesis and manifestations of dumping syndrome.